CLAIMS:

1. A process for operating a reformer system, the process comprising:

introducing a gas mixture to the reformer system;

increasing a proportion of an oxidant in the gas mixture and controlling a flow rate of the gas mixture; and

reacting the gas mixture to form a reformate stream and to increase a temperature in the reformer system, wherein the temperature is effective to remove a contaminant from the reformer system.

2. The process according to Claim 1, wherein controlling the flow rate of the gas mixture further comprises:

monitoring a reformer system temperature;

reducing the flow rate of the gas mixture when the temperature is greater than or equal to a first temperature;

flowing the oxidant into the reformer system when the temperature is less than or equal to a second temperature; and

reducing the flow rate of the oxidant when the temperature is greater than or equal to the first temperature.

3. The process according to Claim 1, further comprising increasing a fuel to air equivalence ratio in the gas mixture and increasing the flow rate of the gas mixture to a peak flow rate.

4. The process according to Claim 1, wherein the oxidant is selected from the group consisting of air, water, carbon dioxide, and combinations comprising at least one of the foregoing oxidants.

5. The process according to Claim 1, wherein the contaminant comprises carbonaceous material.

6. The process according to Claim 1, wherein increasing a proportion of an oxidant in the gas mixture and controlling a flow rate of the gas mixture produces a peak operating temperature in the reformer system at a distance of less than about 10 millimeters from the inlet of the reformer zone.

7. The process according to Claim 1, wherein increasing a proportion of an oxidant in the gas mixture and controlling a flow rate of the gas mixture produces a peak operating temperature in the reformer system at a distance of less than about 7 millimeters from the inlet of the reformer zone.

8. The process according to Claim 1, wherein increasing a proportion of an oxidant in the gas mixture and controlling a flow rate of the gas mixture produces a peak operating temperature in the reformer system at a distance of less than about 7 millimeters from the inlet of the reformer zone.

9. The process according to Claim 2, wherein reducing the flow rate of the gas mixture comprises reducing the flow rate to zero.

10. The process according to Claim 2, wherein reducing the flow rate of the oxidant comprises reducing the flow rate to zero.

11. The process according to Claim 2, further comprising repeating flowing the oxidant into the reformer system and reducing the flow of the oxidant until greater than or equal to about 80 percent of the contaminants present with the reformer system are removed.

12. The process according to Claim 2, wherein controlling the flow rate of the gas mixture further comprises repeating flowing the oxidant into the reformer system and reducing the flow of the oxidant until the temperature is at a third temperature that remains at or below the second temperature.

13. The process according to Claim 2, wherein monitoring the temperature comprises modeling a temperature profile using parameters selected from the group comprising a predetermined flow rate of the gas mixture, a measured flow rate of the gas mixture, an inlet temperature of the gas mixture prior to reacting the gas mixture to form a reformate stream, an estimate of an exit temperature, thermal losses from operating the reformer system, and combinations comprising at least one of the foregoing parameters.

14. The process according to Claim 2, wherein the first temperature is less than or equal to about 1,000°C.

15. The process according to Claim 6, wherein the peak operating temperature is at about 800°C to about 1,000°C.

16. The process according to Claim 12, further comprising shutting down the reformer system when the temperature remains at or below the third temperature.

17. The process according to Claim 12, wherein repeating flowing the oxidant into the reformer system comprises sequentially increasing the flow rate of the oxidant into the reformer system.

18. The process according to Claim 12, wherein repeating flowing the oxidant into the reformer system and reducing the flow of the oxidant forms a periodic flow pattern.

19. A process for operating a reformer system, the process comprising:

introducing a gas mixture to the reformer system and contacting the oxidant and gas mixture with a catalyst material disposed at an inlet to the reformer system to generate a reformate stream and to increase a temperature in the reformer system, wherein the temperature effective to remove a contaminant from the reformer system;

monitoring the temperature of the reformer system;

increasing a proportion of an oxidant in the gas mixture and controlling a flow rate of the gas mixture to produce a peak operating temperature in the reformer system at a distance of less than or equal to about 10 millimeters from the inlet;

reducing the flow rate of the gas mixture to zero and flowing the oxidant into the reformer system when the temperature is less than or equal to a first temperature; and

reducing the flow of the oxidant to zero when the temperature is greater than or equal to a second temperature, wherein the second temperature is greater than the first temperature.

20. The process according to Claim 19, wherein the distance is less than or equal to about 7 millimeters.

21. The process according to Claim 19, wherein the distance is less than or equal to about 5 millimeters.

22. A process for operating a reformer system, the process comprising:

monitoring a temperature of the reformer system;

reducing the flow of a gas mixture into the reformer system to zero when the temperature of the reformer system greater than or equal to a first temperature;

flowing an oxidant into the reformer system when the temperature of the reformer system less than or equal to a second temperature;

reducing the flow of the oxidant when the temperature is greater than or equal to the first temperature;

repeating flowing the oxidant into the reformer system and reducing the flow of the oxidant to zero until the temperature is at a third temperature that remains at or below the first temperature; and

shutting down the reformer system when the temperature remains at or below the third temperature.

23. The process according to Claim 22, wherein reducing the flow rate of the gas mixture comprises reducing the flow rate to zero.

24. The process according to Claim 22, wherein reducing the flow rate of the oxidant comprises reducing the flow rate to zero.